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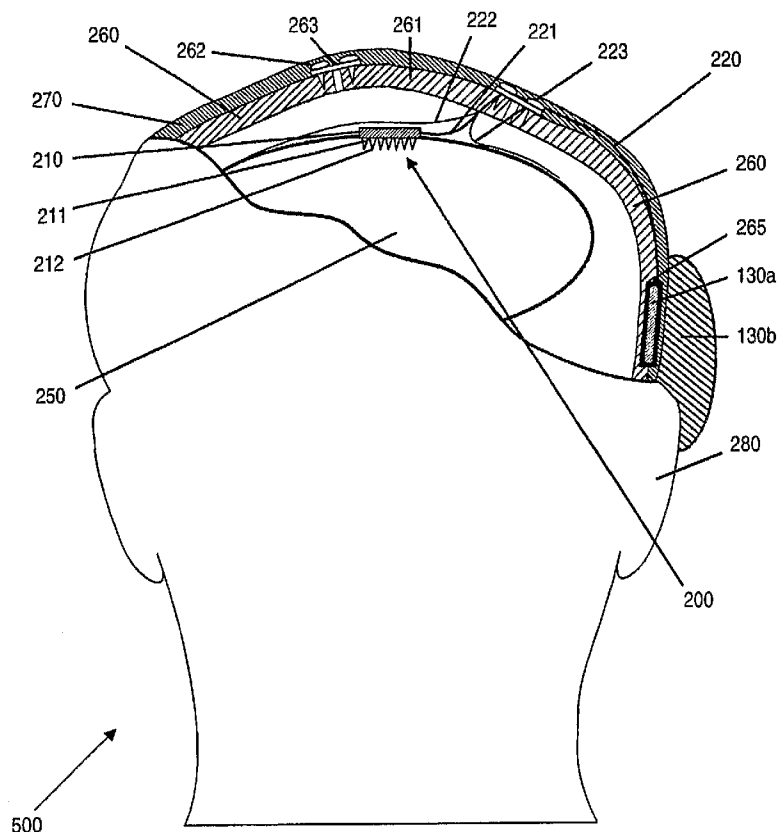
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(54) Title: BIOLOGICAL INTERFACE SYSTEM WITH PATIENT TRAINING APPARATUS



(57) Abstract: Various embodiments of a biological interface system and related methods are disclosed. The system may include a sensor having a plurality of electrodes for detecting multicellular signals emanating from one or more living cells of a patient, and a processing unit configured to receive the multicellular signals from the sensor and process the multicellular signals to produce a processed signal. The processing unit may be configured to transmit the processed signal to a controlled device that is configured to receive the processed signal. The system may also include a patient training apparatus configured to receive a patient training signal that causes the patient training apparatus to controllably move one or more joints of the patient. The system may be configured to perform an integrated patient training routine to produce the patient training signal, to store a set of multicellular signal data detected during a movement of the one or more joints, and to correlate the set of multicellular signal data to a second set of data related to the movement of the one or more joints.



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INTERNATIONAL SEARCH REPORT

International application No
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A. CLASSIFICATION OF SUBJECT MATTER

INV. G06N3/06 G06F3/00 A61B5/00 G09B21/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

G06N G09B G06F A61B A61H

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, INSPEC, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2004/073414 A1 (BIENENSTOCK LUCIEN J E [US] ET AL) 15 April 2004 (2004-04-15) paragraph [0010] - paragraph [0012] paragraph [0034] - paragraph [0097] paragraph [0120] - paragraph [0132] -----	1,89
X	US 2004/267320 A1 (TAYLOR DAWN M [US] ET AL) 30 December 2004 (2004-12-30) paragraph [0012] - paragraph [0025] paragraph [0058] - paragraph [0077] -----	1,89
X	WO 00/09008 A1 (UNIV EMORY [US]) 24 February 2000 (2000-02-24) page 1, line 5 - page 8, line 24 page 12, line 4 - line 29 page 20, line 17 - page 26, line 2 ----- -/--	1,89

☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents :

A document defining the general state of the art which is not considered to be of particular relevance

E earlier document but published on or after the international filing date

L document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

O document referring to an oral disclosure, use, exhibition or other means

P document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

Z document member of the same patent family

Date of the actual completion of the international search

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Name and mailing address of the ISA/

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INTERNATIONAL SEARCH REPORT

International application No
PCT/US2005/047682

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 01/14018 A (UNIV CALIFORNIA [US]) 1 March 2001 (2001-03-01) page 2, line 25 - page 3, line 10 -----	1,89
A	EP 0 782 843 A2 (FERRATI BENITO [IT]) 9 July 1997 (1997-07-09) abstract -----	1,89
A	COLEBATCH J G ET AL: "Responses of monkey precentral neurones to passive movements and phasic muscle stretch: relevance to man" ELECTROENCEPHALOGRAPHY AND CLINICAL NEUROPHYSIOLOGY IRELAND, vol. 75, no. 2, February 1990 (1990-02), pages 44-55, XP002436095 ISSN: 0013-4694 page 52, left-hand column, line 29 - page 53, right-hand column, line 22 -----	1,89

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box II.1

Claims Nos.: 2 - 88, 90 - 174

The First invention of the present application contains 174 claims of which 2 are independent.

There are so many dependent claims (e.g. 39 claims are directly dependent of claim 1), and they are drafted in such a way that the claims as a whole are not in compliance with the provisions of clarity and conciseness (Article 6 PCT), as it is particularly burdensome for a person skilled in the art to establish the subject-matter for which protection is sought when assessing what should be the subject-matter to be searched.

The non-compliance with the substantive provisions is to such an extent, that the search was performed taking into consideration the non-compliance in determining the extent of the search (PCT Guidelines 9.19 and 9.25).

The extent of the search was consequently limited to the Independent claims 1 and 89.

Continuation of Box II.2

Claims Nos.: 2-88,90-174

The present application contains 174 claims. There are so many dependent claims (e.g. 39 claims are directly dependent of claim 1), and they are drafted in such a way that the claims as a whole are not in compliance with the provisions of clarity and conciseness of Article 6 PCT, as they erect a smoke screen in front of the skilled reader when assessing what should be the subject-matter to search. The non-compliance with the substantive provisions is to such an extent, that the search was performed taking into consideration the non-compliance in determining the extent of the search (PCT Guidelines 9.19 and 9.25).

The extent of the search was consequently limited to claims 1 and 89.

The applicant's attention is drawn to the fact that claims relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure. If the application proceeds into the regional phase before the EPO, the applicant is reminded that a search may be carried out during examination before the EPO (see EPO Guideline C-VI, 8.5),

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

should the problems which led to the Article 17(2) declaration be overcome.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2005/047682

Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☒ Claims Nos.: 2 - 88, 90 - 174
because they relate to subject matter not required to be searched by this Authority, namely:
see FURTHER INFORMATION sheet PCT/ISA/210
2. ☒ Claims Nos.: 2-88, 90-174
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
see FURTHER INFORMATION sheet PCT/ISA/210
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:
1-174

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1 - 174

a biological interface system comprising a patient training apparatus configured to receive a patient training signal that causes the patient training apparatus to controllably move one or more joints of the patient.

2. claims: 175 - 184

a biological interface system comprising a first controlled device and a second controlled device wherein the first controlled device provides feedback to the patient to improve control of the second controlled device.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/US2005/047682

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 2004073414	A1	15-04-2004	NONE	
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